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Nature–Culture Linkages of Pulicat Lagoon: A Cultural Landscape Protecting the Coromandel Coast

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Abstract

The Pulicat Lagoon is the second largest water body in India, covering an area of 759 km^2., in the middle of the Coromandel Coast. Its cultural landscape is a testimony to nature-culture linkages that, by integrating the monsoon climate with cultural traditions, favours the development of a resilient society. Strongly present in the maritime history recounts, it has bridged transnational shared heritage. This paper focuses on describing the natural and cultural values of this wetland, which characterizes its cultural landscape: the traditional fishing practice, known as the padu-system, and the lagoon's capacity to absorb shock from disasters with the support of the Buckingham Canal, thus serving as a lifeline to this coast. However, sustainable livelihoods and development, maintained over several thousand years, are under threat due to the erosion of the nature-culture linkages, shown by siltation, blocking of river water inlets due to encroachments, industrial pollution, and the absence of law enforcement. This paper highlights the role of nature-culture linkages in supporting sustainable development and building resilience.

KEY WORDS: lagoon, monsoon, textile, resilience, wetlands, Dutch, Coromandel

1. Introduction

The evolution of nature relates to the environmental conditions of any place and the culture of society evolves in relation to that nature (Bezerra de Melo 2012). The resulting nature-culture linkages are the most valuable assets of a resilient society. In India, the region that shaped its social and economic status with its precious assets is none other than the unique Pulicat Lagoon in the Coromandel Coast (Benedict 2018).

The Coromandel Coast is located along the South-east coast of the Indian subcontinent, running parallel to the coast of the Bay of Bengal, from the Krishna river basin to Point Calimere, and extending southwards up to the coast of Rameshwaram. The origin of the name, Coromandel, has given rise to considerable speculation. For instance, it has been derived by different authorities from *karu-manal*, meaning black sand, or from *Cholamandalam*, the most popular alteration of Chola-mandalam, which refers to the rulers of the coast during the 10th century CE, when Thanjavur was its capital (Thurston 1918). However, the name that has the geological reference to 'black-sand' would rightly be suitable for our understanding of this landscape (Anameka 2010; Stephen 1997). Moreover, the unique climatic condition of this coast makes it the only region in India with the ability to attract the Northeast monsoon. The most furious monsoons, that bring rain clouds to the Coromandel Coast from October to December, are called "trade winds" or "winter-monsoons".

The wetland system of the Pulicat Lagoon [Fig. 1] is one of the three most important wetland systems in India, shared by the states of Tamil

Figure 1: Map of the Pulicat Lagoon; Source: Author

Nadu (TN) and Andhra Pradesh (AP) (APFD 2010). Situated to the north of Chennai, it covers an area of 759 sq.km. The Pulicat Lagoon is known for its 2000-year-old maritime history, which includes exchanges as far as Japan and present-day Europe (Stephen 2014). This paper elaborates on the inextricability of the natural and cultural values in this significant cultural landscape and clarifies how these nature-culture linkages have supported the resilience of this coast.

2. Significance of Pulicat Lagoon as a cultural landscape

Pulicat is an anglicized word of the *Tamil* word for lagoon, *Pazhaverkadu*, which is a combination of three Tamil words: *Pazhaya* (old), *vergal* (root), and *kadu* (forest) (Azariah 2007; Benedict 2018). The wetland is a bird sanctuary of national importance and is the second largest brackish water ecosystem in India. Hundreds of thousands of migratory waterfowl throng the lake from October to April, including large numbers of Greater and Lesser Flamingos (Jacobsen and Raj 2009). The reduction in the sea level over the last three centuries has caused the formation of a beach ridge dune, creating Sriharikota Island. The road connecting the island to the mainland bisects the lagoon in the middle, into two regions, the southern region, Pulicat Lake, and the northern region, the marshy land area [Fig. 3].

The Buckingham Canal stretches for 796 km along the South-east coast of India and its water levels are stabilized by the Pulicat Lagoon. The canal and the three rivers -Arani, Kalangi, and Swarnamukhi – flowing into the lagoon are part of the maritime history due to the popularity of Coromandel cotton and its textile products, which are made in the hinterlands connected by this water system. Arabs, East Asians, and Europeans have

been exchanging the finest textiles produced here for gold since the 6th century CE (Stephen 2014). However, due to a focus on the modernization of railways, authorities have neglected the canal and its water system for the last hundred years (Benedict 2018).

Documentation reveals that the lake used to cover an area of 700 sq.km. during high-tide and 400 sq.km. during low-tide, until about 80 years ago; however, the deterioration of the lagoon and its environment have reduced the numbers at present to 460 sq.km. and 250 sq.km. during high-tide and low-tide, respectively (Jacobsen and Raj 2009; Azariah 2007). The changes in water coverage not only cause adverse impacts on the local flora and fauna but also on the rainfall patterns (Sahoo and Bhaskaran 2015). The lagoon was once three meters deep and shell dredging was done regularly, which was used for making lime and poultry fodder. The lagoon has now become shallow and non-navigable following the ban on dredging for seashells, which came after the enactment of the Wildlife Act of India in 1972. The deposited layers of shells have hardened a few parts of the lagoon, which directly impacts its marine life.

The lagoon plays an important role in attracting rain clouds during the annual monsoon season. Historical records prove that a large percentage of cyclones crossed the five large wetlands along the SE coast of India (Sahoo and Bhaskaran 2015). They convey that the health of this wetland directly influences the attraction of rain clouds and the protection of the coastal towns. According to the vernacular knowledge of the inhabitants, the quantity of rainfall could be judged by the movement of winged migrants. The pattern is easily identifiable from early visitors during July-September months, called pilot-birds, who return to communicate with a large number of migrants for the winter monsoon visit. More birds mean a more bountiful fish and prawn harvest during peak monsoon seasons. The bird droppings form algae, which serve as fodder for fishes and prawns. The birds, rainfall, lagoon, and livelihood of the inhabitants are directly and proportionally interrelated, thus positioning these migratory birds at the top of the Pulicat wetlands food chain. However, the movement of migratory birds is being affected due to changes in the availability and distribution of food. Therefore, the lives and sustainability of the livelihoods of fishermen, established in the forty-one lagoon villages and depending solely on this water body, have become a serious concern for grass-roots movements (Benedict 2018).

The ecology of the lagoon has influenced the economics of the coastal communities for more than one millennium, which can be seen expressed in the language, food, trade, commerce, and construction technology (Jeyaseela 1997). Marco Polo (1254-1324 AD) expanded on Herodotus's (484-425 BC) observation of Tamil-cotton as the finest and most beautiful cotton that is to be found in any part of the world (Jacobsen and Raj 2009). The arrival of Arab traders, in the 11th century CE, expanded the popularity of the cotton and its market, making this part of the country central to the movement of cotton in the world (Benedict 2018). Archival records show that more than 4,500 ships passed through the Pulicat Lagoon between the 16th and 18th centuries, not only influencing the development of the coastal region but also of its hinterlands (Stephen 2014). Gold was the standard medium of exchange in this region for textile purchases. Gold was imported from Hirado, Japan, by the Dutch starting in 1609 AD, to be minted at the Pulicat Dutch Fort located in the Pazhaverkadu village at the southmost end of the Pulicat Lagoon. Later, due to the heavy demand of gold for the exchange of textiles, they were compelled to import gold from Amsterdam in very large quantities after the Japanese imposed sanctions on the Dutch.

The Pulicat lagoon has sustained even after many modern interventions and maritime exploitations, due to a particular estuarine resource management system practised by the local communities for more than three centuries. The lagoon's unique fishing system is called *Padu*, meaning 'to share,' and is based on rotational fishing rights (Jacobsen and Raj 2009). Only male members from one of the four traditional fishing communities in the area are allocated fishing grounds under this system [Fig. 2]. With this management practice of the coastal commons, the members have nurtured a sense of collective social responsibility. Moreover, non-members of *Padu* cannot fish due to a strict vigil kept by the members on their resource territories (Azariah 2007). These nature-culture linkages have protected the lagoon from all destructive intrusion by state-administration or industrialization, showing the direct link between biodiversity, economic activity, and vernacular sustainable management.

The Hindu temples in the Pazhaverkadu village, built during the 10th and 13th centuries, showcase trade links with other regions from around the subcontinent. Unfortunately, the 13th-

Figure 2: Padu local fisherman fixing his net; Source: Author

century temple was damaged in 2013 and was left in ruin due to unprofessional conservation practices by the local government (Parthasarathy 2013). The protected cemeteries in the Pazhaverkadu village, dating from 1639 to 1850 AD, are considered to be the largest in Asia, bearing testimony to the history of the cotton trade, while Chinese jars and porcelain wares highlight the villages' magnificent trade and cultural links with East Asian countries, including Japan. The first European fort was established in the Pazhaverkadu village by the Portuguese who arrived in 1502, but it was destroyed and rebuilt as Fort Geldria by the Dutch starting in 1602. However, the Dutch fort was completely demolished by the British in 1825 AD and left in ruins. Now it is covered with thorny bushes and is inaccessible.

Another name for Pulicat is *Pallaecatta*, as it was once called by the Europeans, which was later used to describe the fabric quality. *Pallaecatta*, as a fabric, is known as sarong or lungi in Asia, is worn by both women and men, and lungee, in Persian, is used as turbans along the silk-route region. The bandanna in Mexico is still referred to as *Paliacate*, as the material was introduced by the Spanish and Portuguese. This famous fabric, with a particular pattern of weaving and dying, was later popularized by the British as 'Madras Checks.'

The built environment of the Pulicat villages reflects historical layers beginning in the 7th century. Before the landing of Europeans in Pulicat, the Arabs had the largest trade links with the East and West Asian countries from the 6th century. They brought with them the skills of boat building and craft that led to the flourishing of cotton and shipbuilding industries along the coast (Stephen 2014). The socio-economic wealth in the region emerged with international trade and innovation in the financial market, like the creation of the world's first joint-stock Dutch East India Company. Unlike the Portuguese, the Dutch established a company to trade with India and Indonesia which was the first public company to issue negotiable shares and develop into one of the biggest and most powerful trading and shipping organizations. The influence of the Dutch East India company on the economic activity of this coast is definitive.

3. Management, State of Conservation and Challenges for Continuity

India has one of the most elaborate and stringent federal and local legislation for environmental management and protection. Public litigations and NGOs use the Wildlife Protection Act-1972 and Coastal Regulations Act-1991, amongst several environmental legislation, for the protection of the lagoon, as the other legislation does not refer to any kind of wetland systems at all. The enactment of the amended *Wetland (Conservation and Management) Rules* in Sept-2017 from the 2010-Act empowers

Figure 3: Satellite picture of Pulicat Lagoon; © ESRI-India

individual states to form local wetlands authorities. The decision-making power has been delegated to the state governments so that protection and conservation can be done at the local level. Tamil Nadu and Andhra Pradesh states have independent departments to manage their respective parts of the Pulicat Lagoon.

The Indian Space Research Organisation (ISRO) is the main occupant of the Pulicat Lagoon because Sriharikota Island is the only rocket launching station they control. During every winter-monsoon, rockets are launched for telecommunications, astronomical research, and weather satellite purposes. However, the ISRO is not involved in any protection or administrative processes. The protection of the Pulicat Lagoon is handled by the State Forest Department.

Tamilnadu and Andhra Pradesh are designated as Sanctuaries which the state's control, respectively. The decentralisation of federal wetlands authority and empowering state authorities have been criticised by environmentalists as the new enactment indirectly widens the ambit of permitted activities by inserting the 'wise-use' principle, giving powers to the state administration to decide what can be allowed considering higher interests. Absence of prohibited activities in the legislation has led to arbitrary decisions. The Pulicat Lagoon can be easily encroached upon or polluted because there is no clarity on the governing agency. In 2014, the buffer zone of the lagoon was reduced from 10 km to 2 km by the federal government. Additionally, no clear demarcations, such as a "no construction zone," catchments, or its channels, were specified. This has put tremendous pressure on the ecosystem. Apart from government regulations, better monitoring mechanisms are needed to increase the knowledge of the physical, chemical, and biological characteristics of the wetland resources and their values for a better understanding of wetland dynamics.

Climate change is another main source of disruption to the coastal lagoons. The factors, like temperature, precipitation, and sea level rise, have a direct impact on coastal lagoons. In Pulicat, climate change is impacting the breeding ground of prawns and fishes, which is impacting the livelihood of the fishermen (Kripa et al. 2012).

Furthermore, the Tamil Nadu State is known for its multi-hazard vulnerability, the major natural hazards being cyclonic storms, urban and rural floods, and periodic droughts (TN State DRR). Of these, coastal flooding and storms provide the maximum threats. Moreover, the Coromandel Coast is prone to experiencing the heaviest wind speeds during the winter-monsoon season. It is recognized that "twenty-six of the thirty-five deadliest tropical cyclones in world history have been Bay of Bengal storms" (Basu 2015).

Tracing the historical data of cyclones proves that Chennai and its surroundings were less affected by floods until the large-scale encroachment took place, in the last two decades, on the water bodies and canal. Even during the tsunami in 2004, which was a rare event on the coast, there was less impact along the Pulicat and Buckingham Canal regions. According to Dr. B. Ramalingeswara Rao, of the National Geophysical Research Institute (NGRI), the lagoon and the canal acted as a buffer zone and reduced the intensity of the tsunami, this was evident in the sizeable quantities of seawater that entered all through the length of the canal, which runs parallel to the sea coast. The historical interconnections between lakes, lagoons, and irrigation tanks along the Coromandel Coast prove to be a significant resilience buffer, which is in dire need of protection.

The State Disaster Management Perspective Plan 2018-2030 has accorded primacy to the priorities enunciated in the Sendai Framework for Risk Reduction, the Sustainable Development Goals of the Agenda 2030, and the Paris agreement on Climate Change.

4. Conclusion

For centuries, the trade and commerce along the Coromandel Coast were at the forefront and influenced the post-independence growth of India. The Coromandel Coast was the first in bringing new technology, modern science and education systems, and an urban governance system, because of its direct links with Asian and European countries. This development has been supported by nature-culture linkages in the Pulicat Lagoon cultural landscape. Furthermore, these nature-culture linkages have been the base for the resilience of the lagoon communities. However, these strong nature-culture linkages are progressively dissolving due to the modern industrial occupation of the wetlands coupled with climate change. The wetlands of the Coromandel Coast prove to be regulators to this subcontinent, protecting, recharging, limiting flooding, stopping seawater intrusion to hinterlands, sustaining fishermen economy, and supporting the food chain of the ecosystem through its winged-visitors.

The lagoon is staring at a bleak future and is on the verge of vanishing from the map due to industrial pollution, siltation, reduction of the buffer-zone, vegetation removal, excessive fishing, open defecation, reduction in freshwater flow from the three rivers, land encroachments, the government interference into padu, and pollution due to tourism. It needs immediate attention and the establishment of a governing body, such as a Pulicat Lagoon Development Authority, that would develop sustainable development strategies for the whole area in order to enhance the coastal environment. Furthermore, the Pulicat Lagoon could be designated under the Ramsar Convention on Wetlands in order to raise international attention to its challenges.

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